

## LA-UR-19-32609

Approved for public release; distribution is unlimited.

Title: The Spock Syndrome--Logic for Expository Writing

Author(s): Ramos, Octavio Jr

Intended for: Course 2 for the Nuclear Criticality Safety Division

Issued: 2019-12-18

---

**Disclaimer:**

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

***Course Two: The Spock Syndrome—Logic for Expository Writing***

9 a.m. to 11 a.m.

9:00	Instructor introduction
9:01	Overview of today's course
9:02	Expository writing
9:07	Persuasive writing
9:13	Logic's role in expository/persuasive writing
9:20	<b>Exercise on good and bad persuasive writing (5 minutes)</b>
9:25	<b>Review and discuss exercise</b>
9:30	Basic structuring of arguments
9:35	Types of arguments and how they are used
9:40	Validity and soundness and why they are important
9:45	<b>Exercise on argument structures (5 minutes)</b>
9:50	<b>Review and discuss exercise</b>
10:00	<b>10-minute break</b>
10:10	Fallacies—troublesome arguments
10:20	<b>Exercise on fallacies (5 minutes)</b>
10:25	<b>Review and discuss exercise</b>
10:35	Rhetorical strategies for expository writing
10:45	What does it mean for writing to flow?
10:55	Comments and questions
11:00	Class dismissed

## LECTURE FOR COURSE TWO: THE SPOCK SYNDROME—LOGIC FOR EXPOSITORY WRITING

### Instructor Introduction

- **SLIDE 1 (TITLE SLIDE)**
- Good morning, and welcome to the second of six classes on facets of successful technical writing. At this point, you've experienced a course with me that discussed the elements of effective writing. You've also taken your first grammar class, which began to give you the basic components of the tools used to achieve effective writing.
- My name is Octavio Ramos, and I have been a writer for approximately 40 years now. I have been fortunate enough to making writing a career, and recently I celebrated 30 years at Los Alamos National Laboratory as a technical writer-editor. For the past 10 years, I have taught various writing courses to my writer-editor colleagues, as well as Laboratory staff members interested in topics such as proposal writing, interviewing skills, basics of grammar, and grant writing.
- A long time ago, I contemplated majoring in philosophy, which basically would have me thinking deep thoughts about being unemployed. Fortunately, I switched to technical writing, but I also decided to minor in philosophy. As part of that minor, I took a year of logic. I also took classes in rhetoric, and combined these two disciplines enabled me to become a pretty effective writer, particularly when it came to persuasive and descriptive arguments. It's this experience in part that I would like to teach to you today.

### Introduction

- Before we start on this morning's course, I wanted to set the scene regarding what you should expect from today's class and give you an understanding of my teaching method.
- I teach my classes more like **workshops**, so be prepared to work on some **exercises** and afterward **discuss** your work. We learn by doing, so please make an **effort** to work on these exercises.

- Crafting short classes on such **huge** topics is quite a challenge. Understand that what we provide for you in the weeks to come is just the tip of the iceberg. There are **full-semester and even year-long classes** dedicated to these topics, and what we've done is **distill** information to an **introductory** level.
- Please feel free to **interrupt** me at any time to ask **questions**. Ask me to slow down if you feel I am **going too fast** or need further **clarification** on something I've said.

## Today's Course

- **SLIDE 2**
- I call today's class "The Spock Syndrome—Logic for Expository Writing." The title is in deference to the character Mr. Spock of the television series *Star Trek*, originally played by Leonard Nimoy. An alien from the planet Vulcan, Spock was a member of a race that turned from violence and chaos to a philosophy driven by logic.
- Today's class will focus on logic, but specifically we will learn how logic helps with writing effective expository and persuasive prose. Topics covered today include the following:
  - What is expository writing and process writing?
  - What is persuasive writing?
  - What role does logic play in expository and persuasive writing?
  - How do we structure effective arguments?
  - What are validity and soundness and why are they important?
  - What are troublesome arguments known as fallacies?
  - What does it mean for writing to flow?

## Expository Writing

- Let's start this class off by discussing expository writing. Expository writing is a type of writing designed to explain or illuminate. The word's root is "expose," so you could think of this type of writing as "exposing" knowledge.
- The most traditional type of expository writing is the essay, which I am sure most of you worked on in high school and college English classes. Newspapers and magazine articles are other forms of expository writing.
- If you think about it, the classes we've been teaching are a form of expository writing, as we are trying to expose knowledge to you.
- A key driver in expository writing is the **reader**—your primary audience. It is your job as a writer to provide the reader with as much information as necessary to enable the reader to carry out any **instructions** you have outlined. In your case, your target audience is a **user/operator**. When a user/operator has finished reading your document, they should have the tools to carry out what you have proposed. More importantly, they should feel empowered with the knowledge to do so.
- A specialized form of this type of writing is known as **process writing**. Process writing is articulating a specific process—a lot of what CSEDs entail is process writing, from describing what was performed to why it was performed to how it can be improved. All these "components" make up process writing.
- Process writing is not easy—I describe it as heavy lifting. There are no shortcuts or easy methodologies. However, there are some effective strategies to achieve effective process writing. A key strategy is to understand what type of specific writing goes into process writing.
- **SLIDE 3**
- There are four key components when tackling process writing. These four components are common in your documents, so let's take a look at them:
  - **Component 1: Expository.** This type of writing is used to inform or explain the subject to the reader. Your introductory sections serve this purpose. The template even sets limitations on what to discuss and what not to discuss.

- **Component 2: Narrative.** This is writing that tells a story. Now we are not interested in a work of fiction. However, what we want is something that has a beginning, middle, and end. What happened? Who did it? Why was it done? These are just some questions we must consider when developing a narrative.
  - **Component 3: Descriptive.** This type of writing is used to paint a picture for the reader. This type of writing is challenging, as you are attempting to convey what you have experienced to someone who has an idea about it but not a clear one. It is up to you as a writer to set as clear a scene as possible so that the reader and you are in sync as you progress in your instructions/justifications.
  - **Component 4: Persuasive.** This type of writing is the most challenging. Your goal is to influence the reader that what you've presented is sound and should be implemented. There should be little or no doubt about the arguments you have presented. Your arguments should be complete and your language should be cohesive and clear. Understanding is the first step toward successful persuasion, so first and foremost you are trying to achieve understanding.
- Let's take a look at some examples of these components of process writing. It should be relatively easy for you to find which examples work well and which examples require refinement.
  - **SLIDE 4**
  - Take a moment and read this introductory paragraph. Play attention to the title, as this is your first cue about what you are about to read. **(Give class a few minutes to read.)**
  - So, is this a good or bad example? Why would you say it is good? Why would you say it's bad?
  - **SLIDE 5**
  - Yes, this is more of a bad than a good example. There are two principal reasons for my assessment.

- First, the title mentions “history,” but this introductory paragraph is all over the place, mentioning some historical tidbits but deviating to other tangents.
- And second, the language is informal. When writing something expository, work to keep your language as formal as possible. The emphasis should be on effective communication, not you own creativity.
- Organize your thoughts when addressing a section of your document. Stick to the subject and remember that your goal is to first and foremost inform and explain.
- Let’s look at another example. How about this one? **(Give class a few minutes to read.)**
- **SLIDE 6**
- So, is this a good or bad example? Why would you say it is good? Why would you say it’s bad?
- It’s a pretty good example. Why?
- **SLIDE 7**
- Here are some reasons to justify calling this example a good one.
- Note the chunking of paragraphs. One paragraph, one idea, yet the flow from one paragraph to the next builds momentum until the final paragraph.
- Look at the flow of information. The title introduces a “plastic problem,” one that is explained in the first three paragraphs, with a solution followed in the final paragraph. The rest of this story goes into the solution, so the transition from problem to solution is achieved through effective flow and order of ideas.
- Note the structure of the first two paragraphs. The first makes a claim about the plastics problem, with the second paragraph citing a course that justifies the claim.

- Follow the style of writing here—it is a formal style, but it is also not too uptight. Keep this in mind when writing your documents. Writing that comes off as too formal makes it a most tedious read. Remember, you want to inform your reader, but you want to keep him or her interested. There's a fine line here when it comes to effective expository writing.
- Let's look at another example. How about this one? (**Give class a few minutes to read.**)
- **SLIDE 8**
- So, is this a good or bad example? Why would you say it is good? Why would you say it's bad?
- It's a pretty poor example. Why?
- **SLIDE 9**
- The title says that what you are about to read is information about the Terracotta Army. Things start off good with the first sentence, but then the author deviates from the topic to focus instead on the first emperor of China. The writer does not come back to the principal topic, the Terracotta Army, until the last sentence.
- When working on one of your documents, do not deviate from the topic at hand. Be on the lookout for tangents, as these not only bog down your section but in fact could cause unintended problems. Perhaps you make a claim outside the topic at hand, only to have a reviewer or worse, an outside regulator or reviewer, question it. You have now introduced a problem into your document that does in fact not even matter!
- Remember, be like the Mad Hatter in the book **Alice In Wonderland**. Provide the necessary info—and then stop.
- Here is a final example.
- **SLIDE 10**
- So, is this a good or bad example? Why would you say it is good? Why would you say it's bad? (**Give class a few minutes to read.**)

- **SLIDE 11**

- This is a good example of a specific expository form of writing, the persuasive document.
- This introductory paragraph starts off with a question in the title. The author then transitions from this title to an opening paragraph that “sets the scene” by anticipating a reader’s initial thoughts.
- By discounting these thoughts, the writer narrows the topic to a fine point.
- The final sentence reiterates the title, both of which are rhetorical techniques used to titillate the reader.
- This time, the question has been qualified.
- At this point, do you keep reading?
- The writer has done his or her best to titillate your interest. The writer has done this through structure and flow—these are basic components of what is called persuasive writing.

## **Persuasive Writing**

- This last example is one design to persuade a reader to the writer’s point of view. When writing persuasively, your goal is to convince readers to believe in an idea or opinion and in some cases perform an intended action, such as when writing a procedure or instruction.
- **SLIDE 12**
- Persuasive writing falls under three primary techniques:
  - **Ethos** is defined as an appeal to credibility—the word’s root is “ethics.” The writer’s command of the subject matter lends credibility to the information. During my first class, we spoke about a document’s completeness, cohesion, and clarity. These three characteristics strengthen your credibility when presenting information. You must present yourself as an authority to gain credibility. Without it, how will readers accept what you have written?

- **Pathos** is used in persuasive writing as an appeal to emotion. A writer attempts to convince a reader by appealing to emotions, such as sympathy, anger, and sadness. This is a difficult way to convince audiences, as the writer must walk a fine line. However, it is the easiest to attempt, although it often can be overdone.
- **Logos** is an appeal to logical reason. For our purposes, it is a very effective mode of persuasion because this style is scientific in its approach to argumentation. The focus here is to present a complete argument, one that a reader can follow and thus accept.
- **CALL OUT EXERCISE 1 IN THE WORKSHEET.**
- **LET’S TAKE SOME TIME TO REVIEW SOME OF THESE ARGUMENTS. IN THIS EXERCISE, IDENTIFY THE TYPE OF PERSUASIVE WRITING TECHNIQUE USED. IS IT ETHOS, PATHOS, OR LOGOS? SUBJECTIVELY DETERMINE THE STRENGTH OF THE ARGUMENT: IS IT WEAK, MODERATE, OR STRONG? IF YOU CAN, GIVE YOUR REASONING AS TO THE RATING YOU GIVE.**
- **GIVE CLASS 5 MINUTES.**
- **REVIEW AND DISCUSS THE EXERCISE.**
- It’s **logos** that we are primarily interested in today, as this type of approach is likely the principal approach you will take in writing your documents for your organization.
- **SLIDE 13**
- The study of logos is **logic**. Logic is a science that deals with the principles of **reasoning**. There are various concepts that form schools of thought about logical approaches. The type of logic that we will be dealing with today is known as syllogistic logic, which was created by the philosopher Aristotle.
- Aristotle introduced this type of logic in his work the *Organon*. Since that time, other schools of logic have developed, and some see syllogistic logic as more of a historical footnote, but many of its concepts remain core to how we craft reasoning today.

- Syllogistic logic concerns itself with the development of effective arguments. The key to persuasion is often an effective argument.
- Let's define argument: It's not a squabble between two people. Rather, an argument in terms of logical discourse consists of a reason or set of reasons given with the aim of persuading others that an action or idea is right or wrong. The "rightness" or "wrongness" of an idea is analyzed based on **validity** and **soundness**.
- Before we get into validity and soundness, let's explore the structure of arguments.
- **SLIDE 14**
- In logic, an argument consists of series of statements in which a claim is supported by one or more supporting points. The claim is referred to as the **conclusion** and the supporting points are referred to as **premises**.
- The structure of an argument can be manipulated. Thus, it is possible for the conclusion to come first, followed by the premises, or vice versa, with the premises coming first and leading to a conclusion. Trigger words such as thus, therefore, or it follows typically signal a conclusion.
- The conclusion is the **essence** of an argument. The premises serve to **support** the conclusion.
- **SLIDE 15**
- Aristotle recognized four kinds of quantified sentences, each of which contain a subject and a predicate:
  - Universal affirmative: Every S is a P.
  - Universal negative: No S is a P.
  - Particular affirmative: Some S is a P.
  - Particular negative: Not every S is a P.
- **SLIDE 16**

- During Medieval times, students of Aristotelian logic came up with different possibilities based on these quantified sentences. For example,

Every X is a Y (premise 1)  
 Every Y is a Z (premise 2)  
 Therefore, every X is a Z (conclusion)

- Let's take a look at the example below, a classic type of argument. In this argument breakdown, the reasoning goes from premise 1 and premise 2 to the conclusion. The premises do the supporting; the conclusion relies on the truth of the premises to be truthful. The notion is that if the premises are true, then the conclusion must naturally also be true.
- As we will see later, language has the potential to lead us into pitfalls, and logic has its limitations. For example, logic runs into trouble when one or more of the terms involved is **empty**—it has no members. For example, “all trespassers will be prosecuted” implies the existence of at least one trespasser.
- Now that we have an overview of argument structure, let's look at the types of arguments available to us. Arguments break down into two broad categories: **inductive** and **deductive**.

## Inductive Argument

- **SLIDE 17**
- An inductive argument is one in which the premises provide evidence for **believing** that the conclusion is true, but not **conclusive** evidence.
- So, from a premise such as “the ice is cold,” we could state that “all ice is cold.” The validity of the premise is solid, but it does not provide conclusive evidence that the derived conclusion is valid.
- Although inductive arguments are weak, they are effective when describing theoretical or complex work. Scientists often use this type of reasoning to form hypotheses and theories.
- One possible way to make inductive arguments work is to reverse the conclusion and premises. For example:

A billiard ball moves when struck with a cue. Therefore, for every action, there is an equal and opposite reaction.

*Change to*

For every action, there is an equal and opposite reaction. For example, a billiard ball moves when struck with a cue.

▪ **SLIDE 18**

- Inductive reasoning can cause problems. This brings us to a quick overview of concepts known as validity and soundness.
- **Validity** means that each premise stands true on its own. However, when brought together, these premises fail to support the conclusion's claim. Thus, it is possible for an argument to have two valid premises but the conclusion itself is suspect and likely not true.
- This brings us to **soundness**. A sound argument has premises that are true, but combined these premises make it impossible for the conclusion to be true.
- Every hear someone say, "that's a good point, but . . ." This comes from valid arguments that are unsound.
- This example is pretty straightforward. As we will see later when we examine fallacious arguments, the validity of premises often masks the truth of the conclusion.
- An argument may be validly logical, but it also can be untrue.

**Deductive Argument**

▪ **SLIDE 19**

- A deductive argument is one that would be justified by claiming that if the premises are true, they necessarily establish the truth of the conclusion.

- The deductive argument is as follows:

All apples are fruits.

The Granny Smith is a type of apple.

Therefore, the Granny Smith is a fruit.

### **Abductive Argument**

- **SLIDE 20**
- Abductive reasoning is to take an incomplete set of observations and from them derive a conclusion. The term comes from “abduce,” to take away. It’s really more of an educated guess based on observation. It is inference.
- An example is as follows: Your child has a cough, a fever of 101 degrees Fahrenheit, a runny nose, chills, and an aching body. Your best guess is that the kid has the flu. It’s your best guess.
- Like inductive reasoning, abductive reasoning is useful for those forming hypotheses for testing. Doctors often use this form of reasoning, as do law enforcement officers and attorneys.
- **CALL OUT EXERCISE 2 IN THE WORKSHEET.**
- **LET’S TAKE SOME TIME TO REVIEW SOME OF THESE ARGUMENTS. IN THIS EXERCISE, IDENTIFY THE TYPE OF ARGUMENT. IS IT INDUCTIVE, DEDUCTIVE, OR ABDUCTIVE. WOULD YOU SAY THE ARGUMENT IS VALID, SOUND, BOTH? WHY?**
- **GIVE CLASS 5 MINUTES.**
- **REVIEW AND DISCUSS THE EXERCISE.**

## Fallacies

### ▪ SLIDE 21

- Having reviewed how arguments typically work, let's review the common errors in reasoning that undermine the logic in your argument. These errors are known as fallacies.
- What I find interesting about fallacious arguments is that they can be simple or complex errors that are **unintentional** or, because of our human nature, **intentional**.
- I once wrote a paper on how it is possible to use writing to manipulate how readers think and act. The Nazis during World War II had folks who were masters of propaganda, ways in manipulating populations to their point of view. Dystopian novels such as Orwell's **1984**, Huxley's **Brave New World**, Burgess' **A Clockwork Orange**, and Zemniatan's **We** all deal in part with how language affects behavior and how language can manipulate behavioral outcomes.
- Today's obsession with what is termed as "political correctness" is in fact a collection of oftentimes fallacious arguments. The original intensions may have been honorable, but since then factions have taken advantage of these intensions to manipulate audiences to distinct and oftentimes volatile points of view.
- The reverse is also true. When writing instructions, procedures, and other documents, our goal is to reason through writing with readers that our recommendations are valid and sound. Unlike the manipulation of fallacies that lead to techniques such as propaganda, we instead focus on the critical thinker, in effect trying through writing to communicate ideas and techniques that benefit them.
- Let's look at some common fallacies and see if you recognize them in your own writing.

### ▪ SLIDE 22

- A common fallacy encountered in media outlets is known as the **slippery slope**. A slippery slope is a conclusion based on the premise that if A happens, then eventually through a series of steps, so will B, C, D, and so on, until we reach point Z, the end. Thus, if we want to avoid the extremes of point Z, then A should not happen in the first place.
- Let's take a look at the first example. Do you recognize the slippery slope used here?
- Now let's move from something moderately charged to something likely to stir strong feelings and divisions. **READ THE SECOND EXAMPLE.** Underneath the slippery-slope argument is another fallacy, known as substituting emotion for evidence. The word choice in particular, with "kill" and the adverb "only," charge the sentences with strong emotions. If you believe the premise that "firearms are made only to kill people," then the rest of the argument pretty much does not matter, does it?
- **SLIDE 23**
- Using emotion over evidence is a common fallacy. Typically, adjectives and adverbs are to blame for such constructions, but only if there is no evidence to support these qualifiers. Otherwise, these qualifiers are meaningless.
- Look at the words on this list. They are good, strong qualifiers, but on their own, what do they mean? What is fast vs. faster vs. fastest. Why is something easy or difficult?
- Adverbs can be troublesome—or should I say, really troublesome. Look at this example: It's just not crowded, it's definitely crowded. As a standalone sentence, what does this mean?
- Now, let's take a look at the second example. Right off, there's a qualifier—amazingly. However, right after this claim there is a sentence that serves as evidence for the claim. Does it work? Most readers would agree that it does. Note the next sentence, which uses the word "unbelievable." Again, the second sentence charges this word with evidence.
- In any case, whether you choose to believe the claim or not, the writer has provided evidence to support his use of such qualifiers.

- **SLIDE 24**

- Another fallacy that takes advantage of emotion over evidence is known as “begging the question.” Interestingly, some arguments are not even in the form of a question. The idea behind this type of fallacy is that the writer validates his or her claim before even stating the claim itself.
- A classic example is the sentence “He is dumb because he is obviously stupid.” The argument here is actually circular, with the second word’s intention attempting to validate the first word, *dumb*. Also, note the almost insidious use of the adverb “obviously.” This is a subtle technique to bring the audience closer to the point of view of the writer. If it’s obvious and you don’t agree, then you must be as dumb as the person being labeled.
- The second sentence also uses charged words to stack the introduction to bolster the claim. The word’s “filthy” and “polluting” are there to bolster the reasons why coal should be banned.
- One of the most famous thought experiments in philosophy is concept that we all could be just “brains in a vat.” It posits that there is no way for you to know if your experiences are real because you could be nothing more than a brain in a vat. A sophisticated computer program then manipulates your brain to simulate lifelike experiences and you wouldn’t know the difference. Anyone see the movie *The Matrix*? The concept is derived from this thought experiment.
- The example here illustrates begging the question because the speaker already assumes that their experiences are real. The evidence used to support the claim is that they can experience the world through the five senses, but it’s a circular argument. They can’t know for certain that sensory experience is “real.”

- **SLIDE 25**

- This next fallacy can be sneaky, as it attempts to use logical structure to pull a fast one. A False Alternative is an attempt to be all-inclusive. A classic example is the conditional statement, “if you are not with me, then you are against me.”
- In the example on the slide, the assumption here is that if one doesn’t attend church, one *must* be bad. Of course, good people exist who don’t go to church, and good church-going people could have had a really good reason not to be in church.

- The second sentence sets up a false alternative with an “either or” construction. Generally, when this rhetorical strategy is used, one of the options is unacceptable and repulsive, whereas the other is the one the manipulator wants us to choose. Whoever succumbs to this trap has thus made a choice that is forced, and as such, of little value.
- In line with this type of argument is the non sequitur (Latin for “does not follow”). Consider the third example. Again, the structure has set up a false alternative with an “either or” construction. By limiting choice to only two places, it is possible to steer a reader into the direction you want them to go.
- **SLIDE 26**
- This next fallacy is known as discounting. These types of arguments use negative assertions to disprove an argument.
- The first example shows that the premise discounts the possibility of the conclusion. Note that the premise relies on the fact that it has not been done **yet**. This makes the conclusion unsound because there remains the possibility that it may be done **someday**.
- The second argument is often seen in media outlets. Note that one possible goal for setting a minimum age for drinking is to deter underage drinking, not abolish it completely. Suggesting the law is fruitless based on its failure to abolish underage drinking completely, is fallacious.
- The second argument is also known as the “Nirvana Fallacy.” Comparing a realistic solution with an idealized one, and discounting or even dismissing the realistic solution as a result of comparing to a “perfect world” or impossible standard. Ignoring the fact that improvements are often good enough reason.
- The third example is a type of discounting known as destroying the exception. When an attempt is made to apply a general rule to all situations when clearly there are exceptions to the rule. Simplistic rules or laws rarely take into consideration legitimate exceptions, and to ignore these exceptions is to bypass reason to preserve the illusion of a perfect law. People like simplicity and would often rather keep simplicity at the cost of rationality.
- **SLIDE 27**

- The last type of fallacy we will look at today is known as Appeal to Authority. There's some debate about this particular fallacy, particularly when it comes to concepts such as consensus science. However, the type of fallacy we are looking at is a basic one that should be avoided if at all possible. It's something I like to call "appeal to what authority?"
- Note in these examples that the reliance for this fallacy is on the passive voice. In the first example, who voiced the concerns? In the second example, who exactly agreed that the writing in the CSED was poor?
- The third example is one commonly encountered in today's media. This type of writing overgeneralizes the terms "poor person" and "rich person" while also limiting the extent of their "struggle." All three terms are vague, and it is their appeal to emotion that really carries the argument.
- Be very careful not to confuse "deferring to an authority on the issue" with the *appeal to authority fallacy*. Remember, a fallacy is an **error in reasoning**. Dismissing the council of legitimate experts and authorities turns good skepticism into denialism.
- **CALL OUT EXERCISE 3 (THE FINAL EXERCISE) IN THE WORKSHEET.**
- **LET'S TAKE SOME TIME TO REVIEW SEE IF WE CAN RECOGNIZE SOME FALLACIOUS ARGUMENTS. IN THIS EXERCISE, IDENTIFY THE TYPE OF FALLACY YOU SEE. IF POSSIBLE, EXPLAIN WHY YOU FEEL IT IS THAT TYPE OF FALLACY.**
- **GIVE CLASS 5 MINUTES.**
- **REVIEW AND DISCUSS THE EXERCISE.**

### **Rhetorical Strategies for Expository Writing**

- Now that we have a better understanding of how arguments work and how to avoid creating some types of fallacious arguments—arguments that could get us into trouble—let's take a look at some rhetorical strategies that can bolster our efforts in expository writing.

- You have likely applied some of these strategies. However, what I want to do is compile them so that you can refer to them when you get stuck when working on CSEDs. You are likely focusing on content first, a strategy in and of itself, but I want you to have these rhetorical strategies “in your back pocket” so that you can effectively communicate your content to expectant readers, including reviewers and external evaluators.
- **SLIDE 28**
- **Provide a reason.** Don’t forget the power of the word **because**. Psychological studies have demonstrated that people are more likely to **comply** with an instruction or process if you supply them with a reason as to **why**.
- As humans, we admittedly do not like to be told to do something or take action without an explanation. Providing such an explanation or reason goes a long way to achieving **compliance**.
- Let’s look at the three sentences on the slide. The first is an imperative, a basic instruction to be carried out. It provides no explanation, no reason, no justification.
- Now look at the second sentence. It explains the reasoning behind the imperative.
- The third sentence goes a little bit further providing a reason in its introductory clause and a brief explanation in the adjectives that precede the word “review.”
- **SLIDE 29**
- When you present an argument or break down a process and your readers is left thinking, “Yeah, but . . . ,” then, well, you’ve already lost. When writing anything that opens you up to criticism, think about possible objections and address them up front.
- If you have expertise in your subject, you likely already know what arguments will be posed against you. Address them. If you think there are no reasonable objections to what you are about to present, then get ready for a shock when it comes back from review, or worse yet, when a user or an operator questions what you’ve written.

- **SLIDE 30**

- **Compare and contrast.** If possible, use analogies, metaphors, and similes to relate your concept to something that a reader already accepts as true. The idea is to achieve understanding with the reader so that he or she begins to see things like you do. Analogies are particularly useful in helping readers understand complex ideas or instructions.
- Be judicious in your use of these techniques because (1) they could have the reverse effect of making it more difficult to understand an idea and (2) are overwrought and turn off the reader.
- Contrasting works effectively also. If applicable, explain how a process works against another process, possible to demonstrate how your process is better, faster, stronger, etc.
- Let's look at the first sentence. This serves as an introduction to comparing and contrasting thermodynamics and gravity.
- The word **battle** is used to personify the two subjects. There really isn't a battle in the traditional sense, but the writer uses the word to set up what he is about to do. It is a subtle and effective use of personification, one that I believe works well.
- The second example is a more complex one, with the first paragraph introducing the analogy and the second transitioning from the analogy to the subject at hand. Analogies are very useful when attempting to describe something that is difficult to visualize and thus difficult to comprehend. The realm of computer science is one such place, and that is why this analogy is so effective. It paints a picture for the reader for the concept that follows.

- **SLIDE 31**

- Now let's take a look at what can happen when comparisons fail when using techniques such as analogies, metaphors, and similes.
- Does the example make you cringe? It should. There are **two** things wrong with this simile.

- **One**, how many of you have seen the movie *Hellraiser*. If you haven't, this simile makes no sense to you. There is no connection. Let's say you do know about this movie. At this point, such a reader is likely thinking about the movie rather than the connection it has to the glovebox. Again, there is a loss of connection.
- **Two**, this simile goes awry with its use of the term “wreak havoc,” building on the puzzle box in the film but making the comparison inappropriate for the audience. Always keep the audience in mind when crafting such similes, metaphors, and analogies. What would a reader think? What would a reviewer think? What would DOE think?

- **SLIDE 32**

- Let's take quick look at **contrasting**.
  - Read the **first** example. Is it effective? The first sentence is a rhetorical question, one that brings the reader in on the two things to be contrasted. The second sentence uses an introductory clause to limit the contrast, with the remainder of the sentence rolling out the two things being contrasted. Note the word “whereas,” which transitions from one thing to the other.
  - The **second** example attempts to use contrast and fails. When contrasting, be sure that both examples have something in common but a key feature that bears contrasting. If you do not have such an example, then do not use this technique.

- **SLIDE 33**

- **Consistency**. As we discussed during our first class, when making a claim, stop and consider the gist/intent of what you claim—how does it affect other claims in the document.
- If there are ramifications in other sections, take the time to address them.
- Consistency boils down to even **word choice**. One you define the term, continue to use it. Don't feel obligated to change it because it reads as “redundant.” It's not redundant—it's simply effective repetition.

- **SLIDE 34**

- Let's look at this example. In the first paragraph, the researchers (plural) are introduced. Pronouns such as they and their refer to the antecedent, researchers. In the second sentence, the researchers are now team members. Are the team members the researchers? Or is this a different team?
- The second example demonstrates consistency. The word "team" is repeated, with the pronoun "it" used to avoid redundancy, ensuring that we are always talking about the same team.

- **SLIDE 35**

- Consistent word use is important. Read the following example.
- Is an afterglow emission the same as an afterglow pulse? This is an important point, because the resultant confusion or misinterpretation of a reader (to avoid looking uninformed or uneducated) could lead to more dire issues.

- **SLIDE 36**

- **Present a specific problem and then propose a solution.** When we discussed logical arguments, we found that emotion rarely works as well as emotion. Here is a rhetorical technique that subtly uses emotion through structure. Some rhetoricians call this approach "agitate and solve."
- This structure consists of three components, typically broken down by paragraph:
- **Paragraph One: State the problem.** Specify in detail the nature of the problem as linked to your proposed solution. The problem statement is the "agitation" component," as the reader will likely empathize with the problem and will be seeking a solution.
- **Paragraph Two: Present the solution.** The solution should address the specifics of the problem. For example, if the problem is that something works slow, your solution should emphasize how it works faster. This relieves the agitation.

- **Paragraph Three: Justify the solution.** Provide concrete evidence that the solution is directly linked to the problem—in essence, the hows and whys of how your solution is solid for addressing the problem at hand. This explanation legitimizes the solution to the reader.
- This structure is designed to evoke empathy. You want the reader to feel like you understand his or her problem because you’ve dealt with it and have found a successful solution. The credibility of your solution goes way up with a follow-on explanation and a demonstrating throughout that you truly feel the reader’s angst.
- **SLIDE 37**
- **Draw readers in with a good narrative.** This last rhetorical technique lies at the heart of what persuasion is all about. Narratives, or stories, enable readers to persuade themselves, the key to successful persuasion. You could say that we as writers never convince anyone of anything—we simply help others independently come to the conclusion that we were correct all along. If you tell effective narratives, you will find that you are a terribly persuasive person.
- A narrative has a beginning, middle, and end. It draws a reader in using language and style. It tells a story while conveying information. Successful narratives put the reader in the story, so they experience the explanation first hand.
- Here is an example of a narrative the transitions into an explanatory paragraph. The first paragraph uses mystery and evocative language to draw the reader in. We wonder what the “they” are. There are some interesting descriptions and are designed to keep the reader reading.
- The second paragraph reveals the “mystery” through explanation. At this point you’ve read two paragraphs—you are likely to read more.
- Crafting narratives takes skill derived from experience. Once you have the skill, you will have the ability to draw readers in. Remember, CSEDs make for dry reading. If you can introduce basic storytelling techniques, you are likely to be more successful in communicating your ideas and processes to readers who have grown tired of turgid prose.

## What does it mean for writing to flow?

- **SLIDE 38**
- **The key for writing to flow is to produce unbroken threads of information.** As you take readers from sentence to sentence, the information from one sentence should flow easily into the next. In essence, you are weaving a thread of information like a web, with the reader acting like a spider moving through the web.
- There are **four** components to crafting effective flow.
  - **The first is to use transitional words and phrases.** These words and phrases link one sentence to the next. The relationships embodied in these transitions tell reader how information progresses from one point to another.
  - **REFER THEM TO THE EXERCISE SHEET, THE LAST COMPONENT.** Here are some examples of transitional words and phrases.
  - Note how these words and phrases function. These serve as connective tissue for your sentences. As with all rhetorical components, do not overuse these transitional words or phrases, as your writing will quickly become cumbersome. Think of these words and phrases as traffic signs. You only need a few stop signs—otherwise, you impede the flow of traffic.
  - **SLIDE 39**
  - Take a look at this example. Look at how the transitional words keep the narrative flowing.
  - It's interesting just how we as writers rely on these transitional words and phrases to construct our paragraphs so that one sentence flows naturally into the other.
- **SLIDE 40**

- **The second component is to “echo” previous information.** Readers can move smoothly through your information, even without transitional words or phrases, so long as each sentence is a clear follow-on to the previous one. This flow is created by “echoes” of things said previously, typically by repeating a key word or restating a key element of information previously stated.
- **SLIDE 41**
- **Read this example.** Note how the phrase “foundry storage” is repeated to keep the topic on topic. Now, notice how the verb “evaluated” in the first sentence is “echoed” as a noun in the third sentence. Such echoes keep the reader focused on the specific topic under discussion.
- **SLIDE 42**
- **The third component is known as topic stringing.** In such stringing, a writer creates a progression of information about a person or thing called out in the first sentence. That person or thing is repeated in the topic position of succeeding sentences, so that each subsequent sentence kicks off with the same topic.
- **Read the example below.** Note the first sentence, which introduces “the wilderness.” The pronoun it in the next few sentences refer to “the wilderness,” the antecedent. The final sentence reiterates the first topic, taking a risk by using a different word, although the link is there.
- Then there’s the other topic, “man.” Note how man is also echoed through the paragraph.
- **SLIDE 43**
- **Using old-to-new structures.** Readers exit one sentence thinking about what was said in the sentence’s stress position, typically found at the end of the sentence. Because the reader is still thinking about this while reading the next sentence, he or she expects the next sentence to pick up where the previous one left off. If this does not happen, it can yield confusion, particularly if the topic veers too much from the previous one.

- Look at how the stress position works in the following examples. Read the first example. What do you expect the next sentence to be about? Yes, about traffic and communities.
- Now, read the second sentence. Do you expect something different? Perhaps more discussion about how snow is beautiful?
- **SLIDE 44**
- Let's take a look at another example. Read the first sentence and then read the second. **(GIVE CLASS A COUPLE OF MINUTES TO READ BOTH.)**
- Note how the old-to-new structure uses echoes of previous information to keep the reader engaged with an evolving topic. In the first paragraph, there are varying stress positions, which make the reader work at determining the changing topics. In the second paragraph, that work is already done by the writer, making the writing flow which in turn enables the reader to more easily pick up the information.

### **Breakdown of Next Writing Class**

- My final course for you will address numerous rhetorical strategies designed to improve your writing.
- Topics will include effective word use, levels of jargon, effective sentence structure, simplifying ideas, order of ideas, voice, and good use of graphics and captions.
- **SLIDE 45**
- Open to questions and comments.
- Dismiss class.



# **Course Two**

## **The Spock Syndrome— Logic for Expository Writing**

**Octavio Ramos Jr.**  
**Communication Arts and Services**

January 2020

UNCLASSIFIED

# Course Outline

- What is **expository** writing?
- What is **persuasive** writing?
- What role does **logic** play in expository and persuasive writing?
- How do we **structure** effective arguments?
- What are validity and soundness and why are they **important**?
- What are **troublesome** arguments known as fallacies?
- What are some rhetorical **strategies** for expository writing?
- How do we make writing **flow**?



“We reach.”

UNCLASSIFIED

Slide 2

# Four components of expository writing

- **Expository**—informing or explaining
- **Narrative**—using the elements of fiction to tell a nonfiction story
- **Descriptive**—painting a picture for the reader
- **Persuasive**—convincing a reader to your point of view



UNCLASSIFIED

# Good or bad exposition?

## History of Chocolate

Chocolate. Three different types and three different distinct flavors, each of which has its own unique benefits. Because, you know, chocolate is sooooo healthy. It has no sugar in it whatsoever, and has tons of vitamins and minerals (she wrote sarcastically). Chocolate may not have health benefits, but its unique and rich flavor has been influencing human actions since the time of the Aztecs, who used cocoa beans. Historians estimate that chocolate has been consumed for OVER 2000 years! That means that chocolate has been around since the fall of the Egyptian empire. When most people think chocolate, they think of a yummy delicious substance that can be eaten, but what about a substance that people can drink? Not hot chocolate, but actual normal chocolate that you can drink? Well, that's how chocolate began, without all the sugar and milk, just a bitter drink somewhat similar to hot chocolate.

UNCLASSIFIED

Slide 4

# Why is it a poor example?

- Title cites “history,” but the introductory paragraph is all over the place, moving from historical mentions to multiple **tangents**.
- Language use is **informal**—when trying to inform or explain, use formal language.
- The emphasis is on **effective** communication, not creativity.

UNCLASSIFIED

# How about this one?

## Using algae to solve the plastic problem

Imagine our world without modern plastics—they are everywhere, from construction and electronics to transportation and packaging. Overall strength and durability make plastic so useful, but they also make plastic a leading contributor to the world's pollution problem.

According to a study performed by the National Center for Ecological Analysis and Synthesis at the University of California–Santa Barbara, as much as 13 million metric tons of plastic end up in the world's oceans each year. This study also found that about one-half of the 300 million tons of plastic produced worldwide annually is used only *once*. To put these numbers into perspective, in 2014 the United States alone sold more than 100 billion plastic beverage bottles that account for 14 percent of America's pollution problem, despite recycling efforts.

Plastics can take up to 1,000 years to decompose in landfills and oceans. Thinner plastics, such as those used for water bottles, can take more than 450 years to degrade—that's still a long time.

To address this worldwide problem, scientists at Los Alamos National Laboratory have come together to develop an alternative method to sustainably manufacture plastic that is not only durable but is easily biodegradable.

UNCLASSIFIED

Slide 6

# Why is it a good example?

- **Chunking** of paragraphs—one paragraph, one idea
- **Flow** of information—problem to solution
- Note **claim** in first paragraph, followed by **evidence** to support the claim in the second
- Writing is **formal** but not **uptight**

UNCLASSIFIED

# Good or bad example?

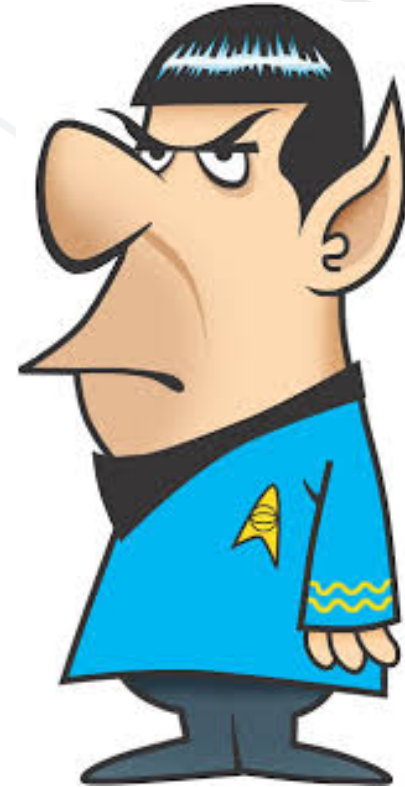
## The Terracotta Army

The Terracotta Army is a big collection of Terracotta sculptures that shows Qing Shi Huang's army. He was the first emperor of China. He and his chief advisor undertook major projects and formed a lot of political and economic reforms. For example, he unified and built many sections of the Great Wall of China. The Great Wall of China is also one of the largest historical monuments in China. Qing Shi Huang also built a massive national road system. All of the projects include the sacrifice of thousands of lives. He had a lot of control and order over his country. Books and scholars who were not accepted by him were burned or buried alive. The Terracotta Army's purpose was to protect the emperor in his afterlife. It acts like a life size army guard to the mausoleum. Today, it is viewed as one of the most amazing historical monuments in China.

UNCLASSIFIED

# Focus

- Do **not** deviate from the topic at hand
- Watch for tangents—they introduce information that is **not** necessary and thus **bog** down your section and maybe even cause **unintended problems**
- Provide the necessary info—and then **stop**



“It is curious how often you humans manage to obtain that which you do not want.”

UNCLASSIFIED

# Is this a good example?

## What is Reality?

Most people do not stop to introspect about what reality really is. Usually, we use the word “reality” to mean what seems to be, or facts filtered through a biased lens. But, it seems there should be one reality. It should not be dependent on people’s perception of what reality is. Reality is not based on thoughts, feelings, and physical sensations. These three elements disrupt that perceiving of reality. So, what is reality then?

UNCLASSIFIED

# A solid persuasive introduction

- Title **transitions** to an opening paragraph
- Introductory paragraph **narrows** a broad topic into a specific one by **eliminating** initial thoughts likely brought up in the reader's own mind
- Final sentence uses a rhetorical technique of **reiterating** the question found in the title
- However, this time, the question has been **qualified** by eliminating certain possible topics

UNCLASSIFIED

# Persuasive writing

- **Ethos:** appeal to credibility
- **Pathos:** appeal to emotions
- **Logos:** appeal to reason

UNCLASSIFIED

# An introduction to logic

- Logic is a science that deals with the principles of **reasoning**.
- The core of such reasoning is known as an **argument**.
- An argument consists of a reason or set of reasons given with the aim of persuading others that an action or idea is **right** or **wrong**.
- Right or wrong is determined by **validity** and **soundness**.

UNCLASSIFIED

# Argument structure

- Arguments consist of one or more **premises** and a **conclusion**.
- The structure can be manipulated, with premises coming first or going last.
- A premise is a claim designed to **support** the conclusion.
- The conclusion is the **essence** of the argument.



UNCLASSIFIED

Slide 14

# Premise breakdown

- Aristotle came up with four basic rhetorical ways to quantify reasoning:
  - Universal affirmative: Every S is a P.
  - Universal negative: No S is a P.
  - Particular affirmative: Some S is a P.
  - Particular negative: Not every S is a P.

S = subject

P = predicate

UNCLASSIFIED

# Argument breakdown

Every X is a Y (premise 1)

Every Y is a Z (premise 2)

Therefore, every X is a Z (conclusion)

Socrates is a man.

All men are mortal.

Therefore, Socrates is mortal.

UNCLASSIFIED

# Inductive argument

An inductive argument is one in which the premises provide evidence for **believing** that the conclusion is true, but not **conclusive** evidence.

Some ice is cold.

All ice is cold. Is it? Because it **depends** on the ice and what you mean as cold.

A billiard ball moves when struck with a cue. Therefore, for every action, there is an equal and opposite reaction.

*Change to*

For every action, there is an equal and opposite reaction.  
For example, a billiard ball moves when struck with a cue.

UNCLASSIFIED

# Inductive reasoning can cause problems

- Harold is a grandfather.
- Harold is bald.
- Therefore, all grandfathers are bald.

**Validity:** Each premise stands as true. However, the conclusion does not follow—it is false.

**Soundness:** Each premise stands as true, so it follows that the conclusion is also true.

UNCLASSIFIED

# Deductive argument

A deductive argument is one that would be justified by claiming that if the premises are true, they necessarily establish the truth of the conclusion.

All apples are fruits.

The Granny Smith is a type of apple.

The Granny Smith is a fruit.

UNCLASSIFIED

# Abductive argument

- Abductive reason is to take an **incomplete** set of observations and from them **derive** a conclusion.
- It's really more of an **educated guess** based on **observation**.



*By Jove, I've been reasoning differently all along.*

UNCLASSIFIED

# Fallacies

Fallacies are errors in reasoning that **undermine** the logic of arguments.

Fallacies can be **unintentional** (accidental) or **intentional**.



*"There are some ideas so wrong that only a very intelligent person could believe in them."*

*—George Orwell*

UNCLASSIFIED

# Slippery slope

If we ban Hummers because they consume too much gasoline, we will eventually ban all gasoline-powered vehicles because they all use gasoline. Thus, we should not ban Hummers in the first place.

Firearms are made only to kill people. We should ban all firearms to avoid people killing people.

UNCLASSIFIED

# Using emotion over evidence

- Fastest
- Slowly
- Easily
- Complex
- Difficult
- Better
- Stronger
- Weaker
- Ideally

It's just not crowded—it's *definitely* crowded.

Amazingly, an atomic armor coating is only one atom thick. By comparison, a single sheet of paper is about 500,000 atoms thick! The unbelievable thinness of atomic armor means that it will not hinder the performance a device.

UNCLASSIFIED

# Begging the question

He is dumb because he's **obviously** stupid.

**Filthy** and **polluting** coal should be banned.

I know that everything I experience is real. I can touch it, smell it, see it, hear it and even taste it all myself.



*What is real? How do you define "real"?*

UNCLASSIFIED

# False alternative

I thought you were a good person, but you weren't at church today.

Either medicine can explain how Mr. X was cured, or it is a miracle. Medicine can't explain how he was cured. Therefore, it is a miracle.

If I am in Tokyo, I am in Japan.

I am not in Tokyo.

Therefore, I am not in Japan.

UNCLASSIFIED

# Discounting

No one has yet to demonstrate that that spacecraft can move faster than the speed of light. Therefore, spacecraft cannot move faster than the speed of light.

What's the point of making drinking illegal under the age of 21? Kids still manage to get alcohol.

Cutting people with a knife is a crime. Surgeons cut people with knives. Surgeons are criminals

UNCLASSIFIED

Slide 26

# Appeal to what authority?

Concerns are being voiced.

It was agreed that the writing for this particular CSED was poor.

A poor person knows well about daily struggles, something a rich person simply cannot fathom.

UNCLASSIFIED

# Provide a reason

- As humans, we admittedly do **not** like to be told to do something or take action **without** an explanation. Providing such an explanation or reason goes a long way to achieving **compliance**.

Submit all CSEDs for review.

Submit all CSEDs for review to ensure users and operators carry out instructions safely, securely, and effectively.

Because users and operators must carry out instructions safely, securely, and effectively, subject-matter experts must submit all CSEDs for content and quality review.

UNCLASSIFIED

Slide 28

# Address objections

- Always be aware of the phrase, “Yeah, but. . . .”
- If you have expertise in your subject, you likely already know what arguments will be posed against you.
- If you think there are no reasonable objections to what you are about to present, then get ready for a shock when it comes back from review, or worse yet, when a user or an operator questions what you’ve written.

UNCLASSIFIED

# Compare

There is an endless battle between thermodynamics and gravity.

Imagine that you have been placed in charge of a city-sized warehouse, one that houses billions of different types of objects inside. Your task is to keep track of every single object within the warehouse—you must be able to identify and retrieve any of these objects at a moment's notice. The first step in keeping track of so many objects is to develop a map.

Today's high-performance computers are analogous to huge warehouses. Within each computer are objects and data—retrieving both requires a “map.” There are various ways to map access to objects or data in a computer.



UNCLASSIFIED

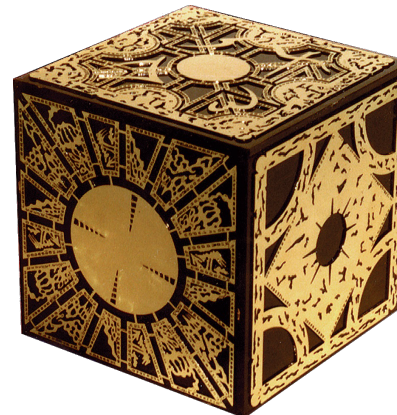
Slide 30

# Compare (continued)

- Gloveboxes are like the Lament Configuration in the film *Hellraiser*—they are useful boxes but can also wreak havoc if safety protocols are ignored.



=



UNCLASSIFIED

# Contrast

- What's a key difference between science and technology? When it comes to evaluation methods, science relies on analysis, generalization and creation of theories, whereas technologies relies on analysis and synthesis of design.
- The small boat gently drifted across the pond exactly the way a bowling ball wouldn't.

UNCLASSIFIED

# Consistency

- **Stop** and **consider** the gist/intent of what you claim in a section—how does it affect other claims in the document?
- If there are **ramifications** in other sections, take the time to **address** them.
- Consistency boils down even to **word choice**. Once you define the term, **continue** to use it. Don't feel obligated to change it because it reads as “redundant.”

UNCLASSIFIED

# Consistency (continued)

*Instead of*

After the researchers were on track for their primary mission, they made a case for observing solar eclipses from on high instead of with land-based equipment. The team's members flew their first solar eclipse mission in 1965.

*How about the following?*

After the research **team** was on track for its primary mission, it made a case for observing solar eclipses from on high instead of with land-based equipment. The **team's** members flew their first solar eclipse mission in 1965.

UNCLASSIFIED

# Consistency (continued)

Nearly a year after discovering prompt optical emissions, RAPTOR measured prompt-optical and **afterglow emission** from the same gamma-ray burst. Often, an **afterglow pulse** has a very simple shape and can be accurately modeled by a time equation.

UNCLASSIFIED

# Present a specific problem and then propose a solution

- **State the problem.** Be specific.
- **State the solution.** Link the features of your solution to those of the problem. For example, if the problem is a slow process, articulate what features in your solution yield a quicker process.
- **Justify the solution.** Explain the hows and whys of how your solution yields a quicker process.

UNCLASSIFIED

# Draw readers in with a good narrative

There are trillions of them—with millions fitting in the eye of a needle—and they are everywhere. They live and thrive in vast communities in typical places, such as the Earth's soil, rivers and oceans, and atmosphere. But they also exist in the oddest of places, such as the human body and in extreme environments like volcanic hot springs and long-frozen ice in the Arctic Circle.

Invisible to the human eye, they are communities of microorganisms, archaea (Greek for “ancient things”), fungi and viruses. Each community is known as a microbiome, and each microbiome can be thought of as an individual metropolis, each as different as New York City is from Albuquerque.

UNCLASSIFIED

Slide 37

# What does it mean for writing to flow?

- The key is **producing an unbroken thread of information**
  - ✓ Use transitional words and phrases
  - ✓ “Echo” previous information
  - ✓ String topics
  - ✓ Use old-to-new structures, as appropriate

UNCLASSIFIED

# Transitional words and phrases

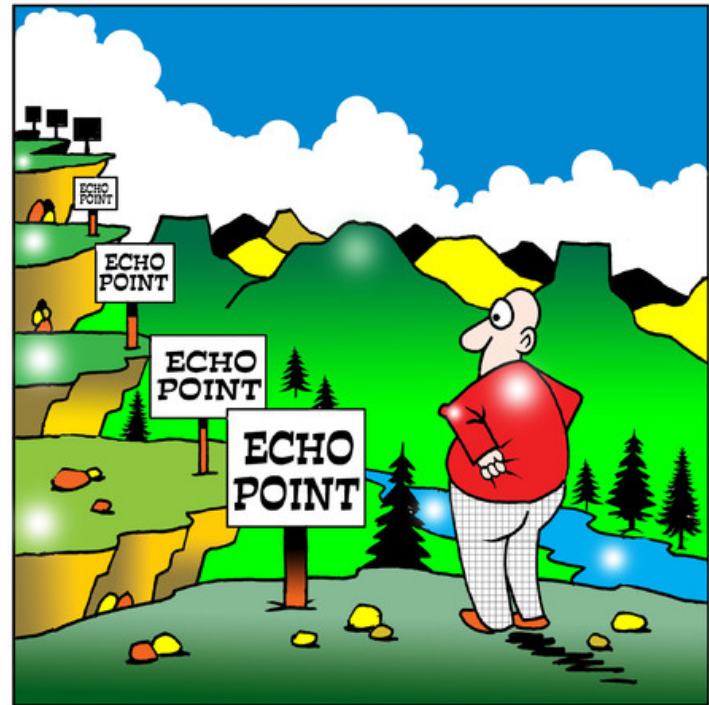
**But** wildfires aren't always a bad thing for the environment. **Indeed**, using fire to manage land goes back thousands of years, with Native American peoples using fire to alter the structure and composition of forest and grassland ecosystems. Fire-management processes **continue** to this day, including prescribed burns. These intentionally set fires eliminate excessive vegetation, **but** don't burn too hot. Water and other nutrients remain in the soil. **Not only** do prescribed burns reduce the risk of wildfires, they **also** can influence the growth of desirable plants in the future.

UNCLASSIFIED

Slide 39

# Echoing previous information

- Readers can move smoothly through your information, even without transitional words or phrases, so long as each sentence is a **clear** follow-on to the previous one.
- This flow is created by “echoes” of things said previously, typically by **repeating** a key word or restating a key element of information previously stated.



UNCLASSIFIED

Slide 40

# An example of an echo

The Nuclear Criticality Safety (NCS) Division has **evaluated foundry storage** at NMCA location 302S in glovebox GB-360 in Room 327 of PF-4. **Foundry storage** will be used solely for material staging of plutonium metal in water-resistant containers fitted with engineered spacers. This **evaluation** is conducted in accordance with NCS-AP-004, *Criticality Safety Evaluations* [Ref. (1)] and documented per the format and content expectations contained in CSED-TMPLT-19-1.

UNCLASSIFIED

# Stringing topics

**The wilderness** masters **the colonist**. **It** finds **him** a European in dress industries, tools, modes of travel, and thought. **It** takes **him** from the railroad car and puts him in the birch canoe. **It** strips off the garments of civilization and arrays **him** in the hunting shirt and the moccasin. In short, at **the frontier** the environment is at first too strong for the man.

Frederick Jackson Turner  
Historian

From “**The Significance of the Frontier in American History**”

UNCLASSIFIED

Slide 42

# Using old-to-new structures

Although snow is beautiful, its is disruptive to traffic and communities.

*What do you expect the next sentence to be about?*

Although snow is disruptive to traffic and communities, it is beautiful.

*How about now?*

UNCLASSIFIED

# Another example

Scientists are learning surprising things about the universe by studying black holes in space. The collapse of a dead star into a point perhaps no larger than a marble creates a black hole. So much matter compressed into so little volume changes the fabric of space around it in puzzling ways.

*How about*

Scientists are learning surprising things about the universe by studying **black holes** in space. A **black hole** is created by the **collapse** of a dead star into a point perhaps **no larger than a marble**. So much matter **compressed into so little volume** changes the fabric of space around it in puzzling ways.

UNCLASSIFIED

Slide 44

# Questions and comments



**Logic: another thing that  
penguins aren't very good at.**

UNCLASSIFIED

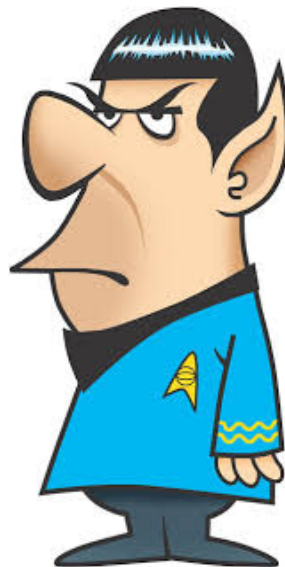
Slide 45

# **THE SPOCK SYNDROME— LOGIC FOR EXPOSITORY WRITING Course Two**

## **Exercises**

**Octavio Ramos Jr.  
Communication Arts and Services**

**665-3897, [orj@lanl.gov](mailto:orj@lanl.gov)**



*“Insufficient facts always invite danger.”*

## EXERCISE 1

### Ethos, Pathos, or logos

*Read each sentence. Is this type of writing ethos, pathos, or logos? Determine the strength of the argument. Is it strong, moderate, or weak? What is your reasoning for the rating you have given?*

1. As a medical doctor with 20 years of experience, I can tell you that the x-ray I have just examined indicates that you have a sprained ankle, not a broken one.

---

---

2. They've worked against everything we've worked so hard to build, and they don't care who gets hurt in the process. Make no mistake, they're the enemy, and they won't stop until we're all destroyed.

---

---

3. More than one hundred peer-reviewed studies have been conducted over the past decade, and none of them suggests that this is an effective treatment for hair loss.

---

---

4. We have a video of the defendant breaking into the home. We have witness testimony placing the defendant at the scene of the crime. We have forensics evidence that the defendant touched the window to gain entry and left hair follicles in the living room. We also have testimony that the defendant sold the stolen goods from the burglarized home to a pawn shop. This is an open-and-shut case—the defendant is guilty of breaking and entering and theft.

---

---

### EXERCISE 1 (continued)

5. There's no price that can be placed on peace of mind. Our advanced security systems will protect the well-being of your family so that you can sleep soundly at night.

---

---

6. Our expertise in roofing contracting is evidenced not only by our 50 years in the business and our staff of qualified technicians, but in the decades of satisfied customers who have come to expect nothing but the best.

---

---

7. Research shows that private demand for the product has tapered off for the past three years, and this year's sales figures are at an all-time low. It's time to research other options.

---

---

## EXERCISE 2

### Inductive, deductive, abductive

*Read each sentence. Is this type of argument inductive, deductive, or abductive? Is the argument valid, sound, or both? Justify your reasoning.*

1. There is no such thing as drought in the West. California is in the West. California need never make plans to deal with a drought.

---

---

2. Holmes walks into the old second-hand store and looks across the counter. The man standing there glances up before returning to his bookkeeping. Holmes turns to his companion and says, "That, my dear Watson, is the man we are looking for."

"But Holmes, how on Earth can you know such a thing? You've not even spoken to him!"

"Ah, but you see Watson, it is simple. I noticed that his beard is ragged and untrimmed, but its style implies that it is usually well kept. This means that he had little or no time this morning to undertake his usual particulars. He is wheezing slightly, showing that he was out of the shop this morning in the dense smog we have been having all over London. And, of course, he is wearing the stolen watch on a chain in his waistcoat."



"Eee Gads Holmes, I just don't know how you do it!" exclaims Watson.

---

---

3. Every quiz in this class has been easy. Every test in this class has been easy. Thus, the final exam will be easy.

---

---

## EXERCISE 2 (continued)

4. The chemist old-fashioned slides at last year's technical presentation. This same chemist used old-fashioned slides yesterday at the luncheon. This chemist will use old-fashioned slides for tomorrow's presentation.

---

---

5. All noble gases are stable. Helium is a noble gas. So, helium is stable.

---

---

6. All farmers like burgers. Jethro likes chicken wings. Therefore, Jethro is not a farmer.

---

---

7. A bee stung me the other day. I looked it up: it's a hymenopteran. Yesterday, as bad luck would have it, a wasp stung me. It turns out it's a hymenopteran. This morning, a fire ant stung me. It's also a hymenopteran. So, all hymenopterans have stingers.

---

---

8. The number of chicks in the pen is less than 10. The number of chicks in the pen is more than 6. It's not 7 and it is not 9. The number of chicks in the pen is an integer, because you can't really have half a chick in the pen. Certainly, then, the number of chicks in the pen is 8.

---

---

### EXERCISE 3

#### Fallacies

*Read each sentence. What fallacy do you see? What is your reasoning for selecting the fallacy type?*

1. According to various sources, the installation of gloveboxes at TA-55 was performed poorly, which means the resultant shoddy workmanship will require more funding to repair and restore.

---

---

2. Free trade will be good for this country. The reason is patently clear. Isn't it obvious that unrestricted commercial relations will bestow on all sections of this nation the benefits which result when there is an unimpeded flow of goods between countries?

---

---

3. Power lines cause cancer. I met a little boy with cancer who lived just 20 miles from a power line. He looked into my eyes and said, in a weak voice, "Please do whatever you can so that other kids won't have to go through what I am going through." I urge you to vote for this bill to tear down all power lines and replace them with monkeys on treadmills.

---

---

4. People who drink more than six alcoholic beverages a day are more likely to have health problems than people who do not drink alcohol. After one drink, people lose their ability to make good decisions and end up drinking more and more until they are drinking more than six drinks each day. Therefore, all consumption of alcohol should be banned.

---

---

### EXERCISE 3 (continued)

5. Either you support this law which will give the police more power, or you must be a criminal.

---

---

6. Birds can fly. Penguins are birds. Therefore, penguins can fly.

---

---

7. Buddy Burger has the greatest food in town. Buddy Burger was voted #1 by the local paper. Therefore, Phil, the owner of Buddy Burger, should run for president of the United States.

---

---

8. I once overheard three brothers dividing two candy bars. The oldest brother gave each of the younger two one-half of a candy bar, and kept a whole bar for himself. When asked why he got more candy, he claimed that he was the smartest. A few minutes later, the youngest brother asked the oldest to prove how he happened to be the smartest. In reply, the oldest said, "Because I have more candy."

---

---

## **TRANSITIONAL WORDS AND PHRASES**

### **Addition**

And

Also

First (second, third, etc.)

Moreover (furthermore)

### **Contrast**

However

But

Instead

On the other hand

Otherwise

### **Temporal Order**

Furthermore

In addition

Additionally

Likewise

### **Intensification**

In fact

Indeed

Yes (or no)

### **Clarification**

In other words

That is

To explain

To put it another way

### **Cause and effect**

As a result

Because

Consequently

For that reason

Subsequently

### **Exemplification or explanation**

For example

Specifically

For instance

To demonstrate

### **Summary**

In closing

In short

To sum up

**THE SPOCK SYNDROME—  
LOGIC FOR EXPOSITORY WRITING  
Course Two**

**Answer Key**

**Octavio Ramos Jr.  
Communication Arts and Services**

**665-3897, [orj@lanl.gov](mailto:orj@lanl.gov)**

## **EXERCISE 1**

### **Ethos, Pathos, or logos**

*Read each sentence. Is this type of writing ethos, pathos, or logos? Determine the strength of the argument. Is it strong, moderate, or weak? What is your reasoning for the rating you have given?*

1. As a medical doctor with 20 years of experience, I can tell you that the x-ray I have just examined indicates that you have a sprained ankle, not a broken one.

**Ethos. Moderate argument.**

2. They've worked against everything we've worked so hard to build, and they don't care who gets hurt in the process. Make no mistake, they're the enemy, and they won't stop until we're all destroyed.

**Pathos. Weak argument.**

3. More than one hundred peer-reviewed studies have been conducted over the past decade, and none of them suggests that this is an effective treatment for hair loss.

**Logos. Moderate argument.**

4. We have a video of the defendant breaking into the home. We have witness testimony placing the defendant at the scene of the crime. We have forensics evidence that the defendant touched the window to gain entry and left hair follicles in the living room. We also have testimony that the defendant sold the stolen goods from the burglarized home to a pawn shop. This is an open-and-shut case—the defendant is guilty of breaking and entering and theft.

**Logos. Strong argument.**

5. There's no price that can be placed on peace of mind. Our advanced security systems will protect the well-being of your family so that you can sleep soundly at night.

**Pathos. Weak argument.**

6. Our expertise in roofing contracting is evidenced not only by our 50 years in the business and our staff of qualified technicians, but in the decades of satisfied customers who have come to expect nothing but the best.

Ethos. **Weak** argument.

7. Research shows that private demand for the product has tapered off for the past three years, and this year's sales figures are at an all-time low. It's time to research other options.

Ethos. **Strong** argument.

**What's lacking in all these claims? Evidence. Remember, an argument is strongest when presented with facts and figures that THE READER can review and come to the same conclusion as you.**

## EXERCISE 2

### Inductive, deductive, abductive

*Read each sentence. Is this type of argument inductive, deductive, or abductive? Is the argument valid, sound, or both? Justify your reasoning.*

1. There is no such thing as drought in the West. California is in the West. California need never make plans to deal with a drought.

**Deductive.**

**Valid: If you accept both premises as true, then the conclusion is true.**

**Not sound. Premise 1 can be true or false.**

2. Holmes walks into the old second-hand store and looks across the counter. The man standing there glances up before returning to his bookkeeping. Holmes turns to his companion and says, "That, my dear Watson, is the man we are looking for."

"But Holmes, how on Earth can you know such a thing? You've not even spoken to him!"

"Ah, but you see Watson, it is simple. I noticed that his beard is ragged and untrimmed, but its style implies that it is usually well kept. This means that he had little or no time this morning to undertake his usual particulars. He is wheezing slightly, showing that he was out of the shop this morning in the dense smog we have been having all over London. And, of course, he is wearing the stolen watch on a chain in his waistcoat."



"Eee Gads Holmes, I just don't know how you do it!" exclaims Watson.

**Abductive.**

**Valid: If you accept the observations as true, then the conclusion is likely true.**

**Sound: Again, the conclusion is based on an incomplete set of observations, but the logic is sound.**

**Abductive arguments are based on an incomplete set of observations. Strict testing or more testing should happen, but in such cases it may not happen, particularly when dealing with sciences like forensics and archaeology or practices like solving mysteries or addressing theological ideas.**

3. Every quiz in this class has been easy. Every test in this class has been easy. Thus, the final exam will be easy.

**Inductive.**

**Valid: If you accept the premises as true, then the conclusion is also true.**

**Not sound. The conclusion is a generalization based on the premises. The exam may in fact be difficult.**

## EXERCISE 2 (continued)

4. The chemist old-fashioned slides at last year's technical presentation. This same chemist used old-fashioned slides yesterday at the luncheon. This chemist will use old-fashioned slides for tomorrow's presentation.

### **Inductive**

**Valid:** If you accept the premises as true, then the conclusion is true.

**Not sound.** Again, this is a general statement brought out by specific premises. The chemist could surprise his audience with a video presentation or no presentation materials at all.

5. All noble gases are stable. Helium is a noble gas. So, helium is stable.

### **Deductive.**

**Valid:** If you accept both premises as true, then the conclusion is true.

**Sound.** The premises inevitably lead to the conclusion.

6. All farmers like burgers. Jethro likes chicken wings. Therefore, Jethro is not a farmer.

### **Deductive.**

**Valid:** If you accept both premises as true, then the conclusion is true.

**Not sound.** The specifics do not add to the conclusion. For example, Jethro may also like burgers, but that still would not make him a farmer.

7. A bee stung me the other day. I looked it up: it's a hymenopteran. Yesterday, as bad luck would have it, a wasp stung me. It turns out it's a hymenopteran. This morning, a fire ant stung me. It's also a hymenopteran. So, all hymenopterans have stingers.

### **Inductive.**

**Valid:** If you accept all premises as true, then the conclusion is true.

**Not sound.** Specifics lead to a general statement. You could fix the argument by saying that all hymenopterans *are likely* to have stingers.

8. The number of chicks in the pen is less than 10. The number of chicks in the pen is more than 6. It's not 7 and it is not 9. The number of chicks in the pen is an integer, because you can't really have half a chick in the pen. Certainly, then, the number of chicks in the pen is 8.

### **Deductive.**

**Valid:** If you accept both premises as true, then the conclusion is true.

**Sound.** Note how it's the collective of all the premises that leads to inevitability that the conclusion is true. Some arguments can be quite complicated. However, the reasoning should flow like this example, so that a reader understands the truth of the conclusive statement.

### EXERCISE 3

#### Fallacies

*Read each sentence. What fallacy do you see? What is your reasoning for selecting the fallacy type?*

1. According to various sources, the installation of gloveboxes at TA-55 was performed poorly, which means the resultant shoddy workmanship will require more funding to repair and restore.

**Appeal to authority. Who are the sources? Why would you listen to such a vague source for an evaluation that leads to additional spending?**

2. Free trade will be good for this country. The reason is patently clear. Isn't it obvious that unrestricted commercial relations will bestow on all sections of this nation the benefits which result when there is an unimpeded flow of goods between countries?

**Begging the question. Free trade is synonymous with unrestricted commercial relations. Good is synonymous with benefits.**

3. Power lines cause cancer. I met a little boy with cancer who lived just 20 miles from a power line. He looked into my eyes and said, in a weak voice, "Please do whatever you can so that other kids won't have to go through what I am going through." I urge you to vote for this bill to tear down all power lines and replace them with monkeys on treadmills.

**Emotion over evidence. Evoking a child with cancer to change how power is generated.**

4. People who drink more than six alcoholic beverages a day are more likely to have health problems than people who do not drink alcohol. After one drink, people lose their ability to make good decisions and end up drinking more and more until they are drinking more than six drinks each day. Therefore, all consumption of alcohol should be banned.

**Slippery slope. A specific claim leads to a generalization that benefits the conclusion.**

5. Either you support this law which will give the police more power, or you must be a criminal.

**False alternative. Presents two options only. Just because you don't support a law does not make you a criminal. Note how this argument is used today, particularly when it comes to labeling someone a racist.**

### EXERCISE 3 (continued)

6. Birds can fly. Penguins are birds. Therefore, penguins can fly.

**Discounting; specifically, destroying the exception. In this case, a penguin is the exception.**

7. Buddy Burger has the greatest food in town. Buddy Burger was voted #1 by the local paper. Therefore, Phil, the owner of Buddy Burger, should run for president of the United States.

**False alternative. This is a non sequitur. Phil must make one hell of a burger, but it does not follow that such prowess makes him an ideal candidate for President of the United States.**

8. I once overheard three brothers dividing two candy bars. The oldest brother gave each of the younger two one-half of a candy bar, and kept a whole bar for himself. When asked why he got more candy, he claimed that he was the smartest. A few minutes later, the youngest brother asked the oldest to prove how he happened to be the smartest. In reply, the oldest said, "Because I have more candy."

**Begging the question. Circular argument. Takes more candy because he is the smartest. He is the smartest because he has the most candy.**